Final Report

2.4-31

Development of a Disease or Sub-Optimal Production Investigative Unit in Saskatchewan

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ERDA Project 2.4-31

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1.0 Executive Summary

1.1 Abstract

Personnel at the Western College of Veterinary Medicine, in conjunction with private practitioners, their producer clients, and other associated professionals investigated thirty-four diverse disease or sub-optimal production problems in Saskatchewan. With greater than half of the requested investigations, the problems were considered routine and could have been managed by the producer and his veterinarian. A previously unreported infectious cause of abortion was identified and three nutritional problems rarely observed in Saskatchewan were diagnosed on five properties. One herd, with the characteristic features associated with the feeding of moldy barley straw, allowed further study of this cause of severe neonatal calf loss. This pilot effort has provided the Saskatchewan agricultural community with an enhanced disease investigation capability to deal more efficiently with livestock herd problems.

1.2 **Summary**

Introduction:

Faculty and Professional Associates at the Western College of Veterinary Medicine, in association with private practitioners and their producer clients, provincial pathologists and other professionals investigated thirty-four diverse disease or sub-optimal production problems in Saskatchewan. Almost 80% of these investigations were funded through the mechanism made possible by ERDA funds. The local veterinarian or pathologists in the Provincial Veterinary Pathology Diagnostic Laboratories would identify a producer or veterinary complaint about an on-farm disease problem. The suitability of an investigation would be approved by the standing committee and personnel appropriate to the described outbreak would make a farm visit. The standing committee consisted of Drs. C. S. Rhodes, P. Rempel and G. Royan representing the WCVM, the provincial government and the SVMA respectively.

The Problems:

A summary of the investigations is presented in Appendices 4.1 and 4.2. Many of the problems were routine and could have been handled at a local level but were not because of time constraints, communication breakdown or a request for an independent perspective.

A previously unreported cause of abortion was identified. A new well constructed under a government sponsored drought management strategy was responsible for poisoning cows. In the fall of 1988, late seeded barley was harvested as livestock roughage and preserved by ammoniation. In the spring of 1989 toxic by-products of the ammoniation process in this roughage resulted in considerable neonatal calf loss. High rainfall in the Saskatchewan northwest crop region produced some wet barley straw. On one farm, feeding this roughage that had become very moldy produced a poison that created severely deformed calves at birth (no canal for the spinal cord).

Conclusions:

It is evident that many herd problems can not be solved by presentation of live or dead livestock to a clinic or diagnostic laboratory respectively. To determine if a real problem exists or not is the first task and requires considerable effort and expense to reassure those involved that nothing other than routine problems are occurring.

Abortion storms that are occurring or have occurred and loss of newborn calves continues to be the most common of producer complaints to veterinarians, to the diagnostic laboratories, and to WCVM. To make a diagnosis and to manage these diseases efficiently means a significant number of cows or calves must be examined by a variety of means and this can only be done at the farm level. The capability to examine as many outbreaks as possible has a significant cost benefit. Ten out of thirty-seven investigations revealed unusual syndromes that have potential implications for all livestock producers in the province.

1.2 Future Research Directions

Clearly the coordination of a disease or sub-optimal production investigative unit for food producing animals in this province should continue and eventually become part of the diagnostic support system. Neonatal calf loss remains a major cause of financial loss to the cow-calf producer. Determining the cause(s) of this loss, with a view to prevention, is an obvious conclusion. Improving our capability to make definitive diagnoses on aborted calves has emerged as another challenge. The herd with almost all calves born without a spinal canal represents the seventh herd in Saskatchewan where wet barley straw may be the incriminated teratogen (poison causing abnormalities in the unborn). This obviously can be an important problem in Saskatchevan herds and should be further examined, as should ammoniated forage toxicosis (poisoning). In the feedlot, various manifestations of infection with Hemophilus somnus are emerging as the most significant disease in recently placed calves, causing considerable losses in terms of treatment costs, death and culling. Further study is required to understand the occurrence of this disease complex and to identify effective methods of treatment, control and prevention.

Technical Report

Development of a Disease or Sub-Optimal Production Investigative Unit in Saskatchevan

ERDA Project 2.4-31

E. D. Janzen

2.0 Abstract

Personnel at the Western College of Veterinary Medicine, in conjunction with private practitioners, their producer clients and other associated professionals, investigated thirty-four diverse disease or sub-optimal production problems in Saskatchewan. With greater than half of the requested investigations, the problems were considered routine and could have been managed by the producer and his veterinarian. A previously unreported infectious cause of abortion was identified and three nutritional problems rarely observed in Saskatchewan were diagnosed on five properties. One herd, with the characteristic features associated with the feeding of moldy barley straw, allowed further study of this cause of severe neonatal calf loss. This pilot effort has provided the Saskatchewan agricultural community with an enhanced disease investigative capability to deal more efficiently with livestock herd problems than in the past.

2.1 Background and Objectives

A Historical Perspective:

In Saskatchewan, the veterinary diagnostic support system has consisted of the laboratory facility and personnel operated by the WCVM in Saskatoon and by the Provincial Veterinary Laboratory in Regina. This system has provided diagnostic support by sophisticated examination of submitted necropsy and clinically sampled material in a fashion second to none.

For many herd problems, however, this system is inadequate. An accurate laboratory diagnosis depends on receiving representative samples that are in good condition. Submission of material to the conventional diagnostic support system is subject to an array of selection bias that precludes a correct diagnosis.

In a similar fashion, veterinary effort at the local level often does not include a complete examination of the herd. In the average Saskatchewan herd of 61 cows, a complete examination for neonatal loss would probably require a good days' effort. Time constraints on the veterinarian and financial restrictions on the producer mean that these "on-farm" disease descriptions rarely occur.

2.1 Objectives of Disease Investigation Capability:

The delivery of veterinary diagnostic capability in Saskatchewan has some real limitations. With that as background, it was considered appropriate to examine in a pilot fashion whether this could be corrected. The objectives were to investigate disease problems; describe their severity; and identify the factors that precipitated the problem. The spontaneous occurrence of natural disease represents the best opportunity to fully observe its effect. The precise conditions that must come together to allow a disease manifestation may not often occur. A complete study of the disease and precipitating factors must therefore be done while the problem is occurring. The primary objective was to have the financial capability to do the preliminary examination and description so necessary to ultimately study the problem in more detail. The immediate payoff would be to stop the outbreak, if possible, and in a broader sense, to prevent its occurrence on a "community" basis. The project would hopefully identify categories of significant disease loss, that should be further examined.

A final objective was to determine if this disease investigation responsibility should become a part of the veterinary diagnostic laboratory system in Saskatchewan.

2.2 Experimental Methods

In the normal course of events, a producer contacts his local veterinarian about livestock loss and it is dealt with at that level. Occasionally the veterinarian will submit necropsy material, clinical pathological, or toxicological samples to the diagnostic labs. Classically, the senior pathologists in the laboratories perceive from the material or the history that a problem or potential problem exists. Thus, the first contact with the veterinarian or producer is made. If the problem escalates, a call for an "on-farm" investigation is made. The established coordinating committee (Drs. C. S. Rhodes, P. Rempel and G. Royan representing the WCVM, the Provincial Government and the SVMA respectively) or two thereof, would approve in principle an expenditure for the effort.

The investigating team would be established and they would contact the producer and his veterinarian and arrange the initial visit. Follow-up contact and visits were made as indicated.

The initial observations and examinations were all recorded and filed on a word processor in the Veterinary Teaching Hospital office. A written report on the herd visit was sent to the producer, his veterinarian, investigators, co-investigators, and committee members. The reports were up-dated as new information became available from the diagnostic laboratories. The suggested format for report write-up is presented in Table 1.

2.2

Table 1

Suggested List of Headings for Writing Up Herd Investigations

- Location and date
- Individuals present and their status
- The complaint
- History of the herd
- Description of the facility
- Production procedure
- Observations
- Laboratory findings
- Data analysis
- Discussion
- Diagnosis of "best fit"
- Recommendations or action list

2.3 Results and Discussions

2.3.1 Results

The investigations are summarized in table form in Appendix 4.1 and in abstract form in Table 4.2. A total of 37 herd problems were examined; 34 were in Saskatchewan. Three additional problems were investigated in Alberta by people involved in the project. Ten out of 37 examinations were supported by means other than the ERDA monies (owner or institution involved) and this included the three Alberta investigations.

Twenty of the requests came from private practitioners; seven came directly from producers; and ten were suggested internally at the Western College of Veterinary Medicine by other clinicians or pathologists.

Probably half of the investigations done could have or should have been handled by the local veterinarian. In 5 cases communication between the veterinarian and his or her client had completely broken down. In the other cases, veterinarians were too busy or were unable to invoice the client for a proper examination of the problem. In several cases, the producers were extremely poor managers and had alienated their local veterinarians with their style of animal husbandry.

Twenty-four of the investigations involved cow-calf herds. In only two herds was the problem predominantly one of the cows specifically. The diseases in the other beef cow herds affected the unborn or the newborn calf. In addition, six feedlots, two swine, four dairy and one sheep problem were examined.

2.3.2 Investigation Highlights

From Appendices 4.1 and 4.2 we can see that examination of abortion storms or perceived storms took considerable project time. In addition, neonatal calf loss was a frequently reported problem requiring diagnostic or disease management support.

A previous unreported cause of bovine abortion was identified. The putative pathogen, Campylobacter jejuni, was found to be ubiquitous in the feces of several cow herds without any abortions. Campylobacter jejuni was not isolated from the feces of mule deer (Odocoileus hemionus) and Pronghorn antelope (Antilocarpa Americana), suspected sources of this bacteria.

The early spring of 1989 was very dry and a joint agreement between the federal and provincial governments provided assistance to construct additional water sources. One of these new wells was poorly located and contained extremely high sulfate levels. These high sulfate levels caused severe polioencephalomalacia in a beef cow herd, killing 5 cows and affecting 6 - 7 more.

In the fall of 1988, late seeded barley was harvested in large round bales. These bales "heated" and in an attempt to stop this spoilage they were ammoniated, creating a toxin called 3 methylimadazole. This toxin causes an encephalopathy (Bovine Bonkers) in feeder cattle, cows and their suckling calves via the milk. In the spring of 1989, this disease resulted in considerable calf mortality on several properties.

In the fall of 1989, high rainfall in Saskatchevan's northvest crop region resulted in some crop aftermath being baled very vet. When this straw was fed to 80% of the cows on one farm, all calves were born with spinal stenosis and ultimately died or were euthanized. The remaining 20% of the covs were not fed this moldy barley straw and their calves were born normal.

In the fall of 1989, calves placed in the feedlot began to develop lameness, identified only as a polyarthritis, and at the same time calves were found "suddenly dead", without immediate premonitory signs of myocardial disease. These lame cattle were examined in great detail at the Large Animal Clinic of the Western College of Veterinary Medicine. These detailed clinical and pathological examinations corroborated the initial field observations about the syndrome.

2.3.3 Discussion

It was evident early on, that as soon as practitioners and producers realized there was a mechanism available whereby the problem could be examined in detail on the farm, its use was requested. Even though many of the investigations were routine, that does not mean that they should not have been done. Practitioners often request exactly what the name suggests; i.e. diagnostic support. When practitioners request diagnostic help, their own time constraints are, surely, a good reason to do so. Similarly, if communication breaks down between producers and their veterinarians, an alternate perspective on the problem is often indicated.

It is probably not necessary to establish an elaborate mechanism to identify herds or problems to be examined. A contact person for coordination should be designated and dedicated to the task. This would allov the same methods that worked until nov to function even better.

Virtually sixty-five percent of the effort was directed at beef cov herds and their calves, either unborn or newborn. This is an industry that is spread out and, more than any other food producing units, cow-calf herds have difficulty justifying expensive examinations into their problems.

This project did suggest that out of 37 investigations, almost 30% were the responsibility of the producer. However, out of this total, several nev and important syndromes and conditions were identified. Three problems, Campylobacter jejuni abortions, sulfate-induced polioencephalomalacia, and moldy barley associated spinal stenosis in neonatal calves took 40% of the effort and funds.

2.4 Conclusions and Impact

This project strongly suggests that a field investigative component should be included in our veterinary diagnostic support system. The fact that many on-farm investigations were redundant, not needed, or could have been done by the local veterinarian is not different from any other aspect of the diagnostic support system. It should be reassuring that with proper examination most producer concerns about livestock loss are routine and in only a small number of cases (5) was a nev syndrome designated as a potential threat to the Saskatchevan livestock industry.

This project encourages team work. Pathologists, clinicians, practitioners, field service clinicians, basic scientists and researchers, producers and, in one case, wildlife officers all worked together to solve on-farm problems. That fact can only be laudable and make a more efficient system. There is a built-in extension component to this project that provides "hands on" teaching at the level of the field veterinarian and his producer client. It is critical to "role model" proper on-farm outbreak investigation techniques so they can be applied by the private practitioners and where possible, the producer will pay for them.

Examination of how the project time was allocated reveals that it basically assisted beef cow herds. The nature of cow-calf production in Saskatchewan is such that it will continue to exist here at a similar level for the foreseeable future. This project is and should be perceived as part of the infrastructure necessary to support that portion of the industry in the province.

If these efforts can be used as an indicator of producer problems, then some animal disease research priorities are clear. Neonatal disease and mortality should be more carefully characterized and its minimization and prevention further studied. It is easy to conclude from Appendix 4.1, that improved methods to diagnose and manage abortion storms would undoubtedly have a lot of producer support. Problems induced by feeding crop aftermath are almost a Saskatchewan problem in Canada. Research efforts into ammoniated forage toxicosis and spinal stenosis in neonatal calves is important if we continue to promote the use and enhancement of crop aftermath in the roughage portion of the cow's diet. Should the drought conditions of the immediate past continue, then water quality and its associated problems will need further research effort as well.

The logistics of operating a disease investigation capability could be improved. The coordinating committee would, in the future, be an unnecessary hurdle. No investigations were declined and the committee initiated several investigations that strained the protocol, i.e. expenses were paid before a report was generated.

The operating mechanism, as specified in the contract, was unwieldy. Professional and technical staff contributed 197 person days for an estimated monetary value of $50,000.00 (Section 3.3). This contribution is done willingly and with enthusiasm. The language in the contract, however, prevented the payment of laboratory fees to laboratories here and elsewhere.

The net result is an imprecise estimate of what the actual laboratory costs were. Often the laboratory costs were greater than the specified $500.00 per day allowable under the contract.

The ability to investigate on-farm disease and sub-optimal production should continue. The contract details should be streamlined and the province should take advantage of the professional and producer enthusiasm to deal with our own situations that may or may not be problems. The long-term objective would be for a task force to examine the broader issue of delivering diagnostic support to the province. If and when this examination were done it would be appropriate to include on-farm investigation as a budgeted item much like the diagnostic pathology laboratories are now.

3.0 List of Papers Prepared and Talks Given

3.1.1 Published Papers

1. Investigations 1 - 37 are published in a technical format. They are summarized in Appendix 4.1 and 4.2.

2. Van Donkersgoed, J.; Janzen, E.D.; Chirino-Trejo, M.; Berry, C.; Clark, E.G.; Haines, D.M. - Campylobacter jejuni Abortions in Two Beef Cattle Herds in Saskatchewan, Can Vet J 1990; 31: 373-377.

3. Brazil, T.J.; Naylor, J.M. and Janzen, E.D. - Ammoniated Forage Toxicosis in Nursing Calves: A Herd Outbreak (in preparation).

4. Gomez, H.; Janzen, E.D.; Clark, E.G. - Polioencephalomalacia in a Beef Cow Herd (in preparation).

5. Janzen, E.D. and Ribble, C.S. - Outbreak Investigation Proceedings Post Graduate Committee in Veterinary Science; The University of Sydney, Australia. Lot Feeding and Beef Production.

6. Van Donkersgoed, J.; Janzen, E.D.; Harland, R.J. - Epidemiologic Features of Hemophilosis Mortality in Feedlot Calves, Can Vet J (submitted March 1990).

7. Ribble, C.S.; Van Donkersgoed, J. - A Flock Investigation of Increased Lamb Mortality (in preparation).

8. Van Donkersgoed, J.; Janzen, E.D.; et al. - Campylobacter jejuni Abortion in Beef Cattle, Can Vet J 1989; 30:560.

9. Van Donkersgoed, J.; Janzen, E.D.; et al. - Prevalence of Campylobacter jejuni in Pronghorn and Mule Deer in Southern Saskatchewan, Can Vet J 1990; 31:302-303.

10. Van Donkersgoed, J. - Rare Bug Causes Abortions. Cattlemen, Feb. 1990, Pages 32-33.

3.1.2 Talks Given

1. Janzen, E.D. - Campylobacter jejuni Abortions.
   Presented to local cattlemen. Hankota. June 19, 1989.

2. Van Donkersgoed, J. - Campylobacter jejuni Abortions.
   Presented to veterinarians at WCVM's June Conference. June 1989.

3. Janzen, E.D. - Investigation of Disease Outbreaks.
   Presented to annual meeting of CVMA. July 1989. Ottava.

4. Janzen, E.D. - Polyarthritis and Other Manifestations of Haemophilosis.
   Presented to Rhone-Poulenc sponsored veterinary seminars at Lethbridge and Nisku, Alberta. January 1990.

5. Janzen, E.D. - Outbreak Investigation, Lot Feeding and Beef Production.
   Post Graduate Committee in Veterinary Science Seminar. June 25, 1990.

4.0 Appended Relevant Summary

4.1 Summary of On-Farm Disease Investigations

Completed by May 31, 1990 for

ERDA Project 2.4-31

SUMMARY OF ON-FARM DISEASE INVESTIGATIONS COMPLETED [redacted] 4, [redacted]90

Owner	Address	Investigator	Referring Vet	Problem	Funded By
1. R. Ceyrenne	Ponteix	Janzen	Raymond	Drug Reactions	ADF
2. B. Richardts	Saskatoon	VanDonkersgoed	Armstrong	BRSV	ADF
3. B. Gee	Indian Head	Janzen/Royan	Royan	BRD "other than arrival"	ADF
4. Vic Koch	Marsden	Janzen/Schumann	Hall	Abortions	ADF
5. Barry Lane	Unity	Janzen/Schumann	Hall	Abortions	ADF
6. Les McCall	Abernethy	Janzen, et. al.	Wilson/Bradov	Calf Scours	ADF
7. George Logel	Balcarres	Janzen, et. al.	Wilson/Bradov	Assorted	ADF
8. B. Larsen	Mankota	Janzen, et. al.	Wilson/Raymond	C. jejuni Abortions	ADF
9. D. Cupples	Mankota	Janzen, et. al.	Wilson/Raymond	C. jejuni Abortions	ADF
10. D. Corcoran	Wood Mountain	Janzen, et. al.	Wilson/Raymond	IBR Abortions	ADF
11. D. Wilkinson	Perdue	Janzen	Brazil	Ammoniated Forage Toxicosis	ADF
12. A. Nelson	Glentworth	Janzen, et. al.	Wilson/Raymond	IBR Abortions	ADF
13. Leroy Penner	Arran	Rhodes	Wyand	Mange	ADF
14. Denis Chabot	Mankota	Janzen, et. al.	Wilson/Raymond	IBR Septicemia	ADF
15. Roy Traynor	Delisle	Janzen	Clark	Ammoniated Forage Toxicosis	Traynor
16. R. Kielo	Delisle	Janzen	---	Hypo Vit A	Kielo
17. C. Smith	Ardath	Janzen	---	Ammoniated Forage Toxicosis	Smith
18. C. Haubrich	Swift Current	Janzen	Dupmeier	Neonatal Loss	ADF
19. I. Stomp	Lanigan	Rhodes/Schumann	Savatsky	Assorted	ADF
20. G. Britton	Aylsham	Janzen	Pratt	Neonatal Loss	ADF
21. R. Young	Lumsden	Royan/House	---	Hypocalcemia	Young
22. W. Hamblin	Vermilion, Alta	Radostits, et. al.	Smith	Neonatal Loss	VIDO/ADA/WCVM
23. D. Prefontaine	Moose Jav	Janzen	---	IBR, BVD, Assorted	Prefontaine

SUMMARY OF ON-FARM DISEASE INVESTIGATIONS COMPLETED MAY 4, 1990

Owner	Address	Investigator	Referring Vet	Problem	Funded By
24. Randy Ridgevell	Delisle	Janzen/Gomez	---	Polio	ADF
25. Hal Jadeski	Asquith	Schumann, et al	---	No Diagnosis	ADF
26. F. & B. Mapletoft	Frenchmen Butte	Janzen	Gray	BRD	Mapletoft
27. H. Entz	Abbey	M. Smart, et al	Dupmeier	Lameness	Abbey Colony
28. V. Koch	Marsden	Janzen, et al	Hall	Abortions	ADF
29. Busvell	Borden	Gudmundson	Barth	Trace element	ADF
30. W. Schilling	Meadow Lake	Petrie, et al	Houston	Osteopetrosis	ADF
31. R. Noble	Marwayne	Janzen, et al	Gray	Genetic Defect	Noble
32. Chisholm	Paynton	Janzen, et al	Ferguson	Spinal Stenosis	ADF
33. H. Heeroma	Neilburg	Janzen, et al	Hall	BRSV, Diarrhea	ADF
34. Clavelle	Viscount	Townsend	Janzen	Polyarthritis	ADF
35. Playdon	Stony Plain	Ribble	Bell	Lamb Mortality	Playdon
36. Robertson	Weldon	Van Donkersgoed	Allen	Enzootic Pneumonia	ADF
37. Weekes	Biggar	Van Donkersgoed	Janzen	Enzootic Pneumonia	ADF

4.2 **Abstract of Disease Investigations**

Completed by May 31, 1990 for

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1. Complaint: Drug reactions following processing of calves preweaning.

   Diagnostic Summary: Drug reactions as evidenced by lethargy, bleeding from the tip of the tail, and fluid blebs of the sclera of the eye were seen in calves following processing in 1985, 1986, and 1987. In 1988 no good drug reactions were seen. No specific drug(s) were identified, although an IBR/P13 vaccine (Tech America) was implicated.

   Recommendations: Given the fact that these reactions were apparently diminishing in severity, it was decided to leave well enough alone. In the event that further reactions develop, it was suggested that some clinically affected calves be brought to the WCVM for examination.

2. Complaint: Respiratory disease in lactating dairy heifers.

   Diagnostic Summary: BRSV-induced pneumonia.

   Recommendations:
   1) Routinely vaccinate 5 - 6 month old calves and two year old heifer replacements one to two months prior to freshening with a MLU BRSV vaccine
   2) re-vaccinate herd with an intranasal MLV IBR/P13 vaccine since serological titers low. Continue routine vaccination.

3. Complaint: High death rate in feedlot calves.

   Diagnostic Summary:
   1) Nutritional deficiency
   2) Routine disease (BRD, Hemophilosis, bloat)

   Recommendations:
   1) Improve nutritional intake of calves
   2) Sort calves to feed better and to mass medicate

4. Complaint: Increased number of abortions in cow herd over the last couple of months.

   Diagnostic Summary: Abortion rate of 2.5% is within accepted limits and there is no reason for concern.

   Recommendations:
   1) Continue keeping good reproductive records of the cow herd
   2) Continue to submit aborted feti to the diagnostic laboratory

5. Complaint: Increased number of abortions in cow herd

Diagnostic Summary: Abortion rate of 5%, exact cause(s) unknown, assumed routine.

Recommendations:
1) Keep good records on reproductive management dates and diseases
2) Submit as many as possible aborted feti to the laboratory
3) Bleed aborted cows and 10% in-contact cows for antibody titer determination to Leptospira

6. Complaint(s):
1) High treatment rate for calf scours
2) Significant neonatal mortality

Diagnostic Summary:
1) Congenital abnormality
2) Hypoxemic calves
3) Viral and bacterial diarrhea

Recommendations:
1) Separate wintering, calving and nursing areas with lots of area, bedding, wind shelter and so on
2) Vaccinate with the E. coli bacterin 2 - 3 weeks prior to calving
3) Be more selective in those calves treated for diarrhea
4) Evaluate efficacy of rota-corona virus vaccine in your herd with your local veterinarian.

7. Complaint: High neonatal calf mortality in dairy calves.

Diagnostic Summary: Production disease due to routine problems

Recommendations:
1) Inventory calf loss and culling of cows and why
2) Record treatments
3) Sort cattle into manageable units
4) Re-evaluate usefulness of nurse cow system

8. Complaint: High abortion rate in beef cows in late gestation

Diagnostic Summary: Campylobacter jejuni abortions

Recommendations: No specific bacterin available in Canada at this time. Herd probably has developed immunity to this bacteria following infection. Continue submitting aborted feti and placentae to diagnostic laboratories in the future. Recommend routine immunization of cattle prior to breeding season with IBR/P13, BVD, Leptospirosis, and vibriosis vaccines since your cattle are at high risk.

9. Complaints:
   1) High abortion rate in beef cows in late gestation
   2) Weak calves at birth
   3) Scours and pneumonia in calves at a few weeks of age

   Diagnostic Summary:
   1) Campylobacter jejuni abortions
   2) Weak calves at birth possibly due to C. jejuni infection
   3) Scours caused by rota and corona virus and possibly complicated by C. jejuni infection

   Recommendations:
   1) Currently there is no commercial bacterin for C. jejuni available. Hopefully the herd has developed immunity following infection. Discuss routine vaccination against common causes of abortion with your local veterinarian.
   2) Recommend:
      a) Routine use of an E. coli/rota and corona virus vaccine
      b) insure adequate and rapid colostrum intake of calves
      c) rotate wintering, calving and nursing grounds
      d) rapid treatment of scouring calves with commercial electrolyte products. Consult with local veterinarian for more specific therapeutics.

10. Complaint: Abortion "storm" in beef heifers and cows

    Diagnostic Summary: Abortions caused by IBR virus infection

    Recommendations:
    1) Revaccinate the entire cow herd 3 - 6 weeks prior to the breeding season with an IBR vaccine and a 4 or 5 way Leptospira bacterin
    2) Routinely vaccinate replacement heifers prior to the breeding season with an IBR vaccine and leptospira bacterin
    3) Revaccinate cow herd every 2 - 3 years for IBR virus
    4) Treat cows for lice and use Ralgro at spring round-up

11. Complaint: CNS disease and death in calves 1 - 14 days of age

    Diagnostic Summary: Ammoniated forage toxicosis, "bovine bonkers"

    Recommendations: Minimize access to ammoniated feedstuff

12. Complaint: High abortion rate in beef cows

    Diagnostic Summary: Abortions caused by IBR virus infection

    Recommendations:
    1) Vaccinate
       a) Calves at weaning
       b) Replacement heifers prebreeding
       c) New incoming cattle with an MLV IBR virus vaccine
    2) Submit all aborted feti to a diagnostic laboratory
    3) Discuss specifics of IBR virus vaccination protocol with your local veterinarian

13. Complaints:
1) Vaginal discharge in sows
2) Illness in sows during lactation
3) Prolonged weaning to estrus interval
4) Poor post weaning performance

Diagnostic Summary:
1) Mixed bacterial culture results from vaginal discharges
2) Illness of sows may be MMA, erysipelas or gastric ulcers
3) Poor reproductive performance may be non-infectious (nutrition, environmental, etc.) or infectious origin
4) Poor-doing weaners may be a management problem
5) Mange

Recommendations:
1) Collect more reproductive data
2) Review erysipelas vaccination program
3) Sort weaners according to size, provide high quality starter, reduce environmental stresses, treat diarrhea problems early
4) Institute regular washing and disinfecting
5) Treat for mange with Ivermectin

14. Complaint: Increased neonatal mortality

Diagnostic Summary: IBR septicemia

Recommendations:
1) Vaccinate entire herd with an MLV IBR vaccine
2) Routinely vaccinate incoming cattle, calves at weaning and replacement heifers prebreeding with an MLV IBR vaccine
3) Treat sick calves with IBR septicemia with broad spectrum antibiotics for several days
4) Routinely submit aborted fetuses and dead calves to diagnostic laboratory
5) Discuss specifics of vaccination protocol for your herd with local veterinarian

15. Complaint: Sudden death in several calves one week and one month of age

Diagnostic Summary:
1) Calves one week old - ammoniated forage toxicosis
2) Calves 1 month old - bronchointerstitial pneumonia (BRSV, P13, Pateurella, Hemophilus

Recommendations:
1) Minimize access to ammoniated feedstuff
2) Consider vaccination of cow herd with BRSV vaccine to boost specific colostral immunity
3) Increase surveillance of calves and treat calves with signs of pneumonia with broad-spectrum antibiotics

16. Complaint: Heifers staggering

Diagnostic Summary: Hypovitaminosis A

Recommendations: Treat yearlings with Vitamin A at branding and provide access to green feed.

17. Complaint: Several dead calves early in the calving season and again in early March.

Diagnostic Summary: Ammoniated forage toxicosis

Recommendations: Minimize access to ammoniated feedstuff

18. Complaint: High neonatal loss

Diagnostic Summary: Stillborn calves, trauma, coliform septicemia, non-regenerative anemia, primary nutritional imbalance

Recommendations:
1) Routine feed and water analysis
2) Coliform vaccination program
3) Spare colostrum for future calvings

19. Complaints:
1) Hard swellings on face of weaned piglets
2) Lameness in sows and gilts
3) Arthritis in piglets and weanlings
4) Chronic enteritis/poor doers in feeders

Diagnostic Summary:
1) Traumatic
2) Trauma, osteochondrosis, arthritis
3) Arthritis - possibly Streptococcus
4) Rectal stricture and secondary peritonitis, chronic enteritis - Treponema and B. coli

Recommendations:
1) Monitor its occurrence to help determine cause
2) Breed gilts at a bit older age, review erysipelas vaccination
3) Reduce fighting and biting in piglets
4) No treatment for rectal strictures

20. Complaint: Neonatal loss

Diagnostic Summary: Neonatal mortality within normal range. No outstanding pattern (calving losses, BRSV pneumonia, Coccidiosis)

Recommendations: Examine wintering, calving and nursing areas with objective of minimizing level of contamination and subsequent diseases such as coccidiosis.

21. Complaint: Stiffness and recumbency in cows

Diagnostic Summary: Hypocalcemia

Recommendations: Affected cows treated with calcium, nutritional management

22. Complaint: High neonatal loss

Diagnostic Summary: Neonatal loss due to BVDV (diarrhea) and its secondary effects (pneumonia)

Recommendations:
1) Analyze the feed and balance rations
2) IBR/BVD vaccination prebreeding in cows and heifers (discuss specifics with local veterinarian)
3) Isolate sick animals and treat
4) Submit all dead calves to the diagnostic laboratory

23. Complaint: Continual high treatment rate, relapse rate and poor treatment response rate in feedlot cattle.

Diagnostic Summary: Pasteurella pneumonia complicated by overt IBR infection

Recommendations:
1) Re-vaccinate problem pens
2) Mass treat problem pens with OTC LA
3) Use approved drugs at bottle dosages, e.g. Trivetrin, Excenel
4) Shorten treatment duration (4 days then LA product)
5) Increase time pen-checking new arrivals and less time with chronics
6) "Traffic-cop" cattle
7) Isolate new arrivals and their sicks from resident cattle
8) Process cattle immediately upon arrival, and
9) Increase working relationship with local veterinarian

24. Complaint: One cow dead and two cows recumbent

Diagnostic Summary: Polioencephalomalacia due to sulfate toxicity in the water

Recommendations:
1) Provide cattle with fresh water
2) Treat affected cattle with 1 gm Thiamine until they recover and provide supportive care

25. Complaint: Sudden death in three Holstein cows

Diagnostic Summary: Unknown

Recommendations: Submit all dead animals for necropsy at a diagnostic laboratory

26. Complaint: BRD wreck in feedlot calves

Diagnostic Summary: Severe pneumonic pasteurellosis due to delayed selection

Recommendations:
1) Process calves at the "yards" and include Vitamin AD. Use OTC LA on Day 3 or Day 6 postarrival
2) Use bottle dose of Borgal for 3 days, if no response then Excenel for 2 days and if still no response then 2 Spanbolets and send to recovery pen
3) "Traffic cop" recovery pen weekly
4) Pull "deeper" and run a pen and mass treat if too many sicks
5) Hold off buying more calves until you have more space

27. Complaints:
1) Drop in milk production
2) Lameness in cows

Diagnostic Summary:
1) Nutritional imbalances
2) Laminitis, footrot, heel horn erosions and corns

Recommendations:
1) Routine ration analysis and appropriate changes
2) Allow milking cows exercise in a well-bedded paddock, introduce pregnant heifers to concrete before they calve, install a footbath, trim cow's claws twice a year

28. Complaint: Increased abortion rate in cow herd.

Diagnostic Summary: Abortion rate of 6.4%, exact cause(s) unknown. Twelve aborted fetuses were only found suggesting abortion rate may actually be 3.7% and within acceptable levels. Cows that showed up bulling may have been incorrectly palpated at pregnancy examination.

Recommendations:
1) Next year, submit all aborted fetuses directly to WCVM laboratory. Consider storing all fetuses in your freezer until the abortion rate exceeds 3%, then submit all frozen fetuses together.
2) Continue to keep good records on reproductive performance.

29. Complaint: Two abortions in heifers.

Diagnostic Summary: Abortion rate within acceptable levels. One abortion due to bacterial infection; the other possibly due to vitamin E/selenium deficiency.

Recommendations:
1) Treat all cows with vitamin E/selenium.
2) Continue to submit all aborted fetuses to laboratory.
3) Continue to keep good reproductive records of cow herd.

30. Complaint: Increased neonatal mortality.

Diagnostic Summary: Osteopetrosis, cause unknown

Recommendations:
1) Keep good records on management and diseases.
2) Submit all dead calves to laboratory.

31. Complaint: Congenital malformations in newborn calves.

Diagnostic Summary: Congenital malformations due to a hereditary defect.

Recommendations:
1) Cull sire COR 23X that produced malformed calves.
2) Cull all calves born to bull COR 23X. Calves should be sold as feeders, not breeding stock.

32. Complaint: Congenital malformations in newborn calves.

Diagnostic Summary: Congenital Progressive Posterior Paralysis (CPPP) due to a mycotoxin present in moldy wet straw.

Recommendations:
1) Discontinue feeding barley and wheat straw and feed alfalfa-brome hay.
2) Submit all dead calves to laboratory.
3) Keep detailed records.

33. Complaint: Increased calf morbidity and mortality.

Diagnostic Summary: Losses due to scours and pneumonia caused by BRSV infection.

Recommendations:
1) Reduce your workload.
2) Revaccinate late calvers with ScourGuard 3.
3) Disperse cows into smaller groups over new ground.
4) Disinfect barn.
5) Do not separate scouring calves from their dam.
6) Use long-acting antimicrobials to treat and abort pneumonia outbreak. Avoid prolonged use of dexamethasone.
7) Vaccinate pregnant cows one month prior to calving with BRSV vaccine, to boost colostral antibody levels.

34. Complaint: Increased polyarthritis in feedlot calves.

Diagnostic Summary: Polysynovitis/arthritis due to *Haemophilus somnus* and/or *Mycoplasma bovis* infection.

Recommendations:
1) Continue routine *H. somnus* vaccination and hope for new efficacious vaccine.
2) Consider prophylactic feed medication with oxytetracycline for the first 45-60 days on feed.
3) Continue to investigate problem.

35. Complaint: Increased lamb morbidity and mortality.

Diagnostic Summary: Losses predominantly in lambs born to eves < 2 years of age and in bottle-fed crossbred lambs; associated with orf infection in these eves and lambs at lambing.

Recommendations:
1) Submit as many as possible dead lambs to the laboratory.
2) Continue to keep good records of management and disease.
3) In the early stages of an outbreak of orf, isolate affected animals and vaccinate remainder. Vaccinate lambs at 6-8 weeks of age if disease persists in the flock. Prelambing vaccination of eve not recommended. There is no specific treatment for orf.

36. Complaint: Pneumonia in beef calves.

Diagnostic Summary: Enzootic (viral) pneumonia

Recommendations:
1) Disperse cow-calf pairs into larger nursing area to reduce exposure to infectious agents
2) Insure adequate intake of colostrum (10% body weight) within first twenty-four hours after birth.
3) Avoid overtreatment with antibiotics - use one broad-spectrum antimicrobial once a day for four days. If no response, give as a final treatment a long-acting drug such as Micotil.
4) Even if calves look healthy, if they are coughing take a rectal temperature and those higher than 40.5° C (105° F), treat. If you wait until they are depressed you may be dealing with bacterial complications and the animal may be a late treatment and therefore respond poorly.
5) Have rations and supplements analyzed by nutritionist to prevent imbalances in trace minerals and vitamins that could predispose to immune suppression.
6) There is insufficient information available from field trials to make good recommendations for the use of vaccines for the control of enzootic pneumonia in calves. Revaccinating heifers and cows one month prior to calving may increase colostral immunity. Discuss with Dr. Allen the use of an IBR/PI3/BRSV/BVD vaccine. Some practitioners have used an intranasal IBR/PI3 vaccine in calves in the face of an outbreak but its efficacy is unknown. Currently there are no efficacious vaccines against pneumonia that can be used successfully in young calves in the presence of maternal antibody (exception: intranasal MLV IBR/PI3 vaccine).

37. Complaint: Increased pneumonia in beef calves.

Diagnostic Summary: Enzootic pneumonia and viral scours.

Recommendations:

1) Keep good records on calving data and calf treatments and deaths.
2) Try and disperse cow-calf pairs into smaller groups and into larger nursing areas.
3) Process all newly purchased cows immediately on arrival. Isolate new arrivals from original herd for three to four weeks before mixing.
4) Revaccinate late calvers with ScourGuard 3 to boost declining colostral antibodies.
5) Ensure calves get adequate colostrum within twenty-four hours after birth.
6) Temperature calves that are coughing, even if they look bright and alert (often do in viral pneumonia). If they temp $\geq 40.5^{\circ}$ C, treat them for pneumonia. If you wait until calf is obviously depressed may be dealing with secondary bacterial pneumonia and animal may be a late pull and therefore may respond poorly.
7) In pneumonia, treat a maximum of eight consecutive days. Use one broad-spectrum antibiotic for four days, if no response, then switch to another. Use the same treatment protocol for all calves so that treatment response can be objectively evaluated. Consider use of Micotil.
8) Vaccinate all heifers and cows one month prior to the breeding season with a MLV IBR/PI3 - Somnugen vaccine and a MLV BVD vaccine. In subsequent years, vaccination of heifers and new additions to the herd is probably sufficient to maintain herd immunity.
9) In the face of an outbreak of scours or pneumonia try and disperse cow-calf pairs. Consider mass treatment with Micotil in the face of a pneumonia outbreak.
10) Consider the use of a MLV intranasal IBR/PI3 vaccine to all in-contact calves in the face of an outbreak.